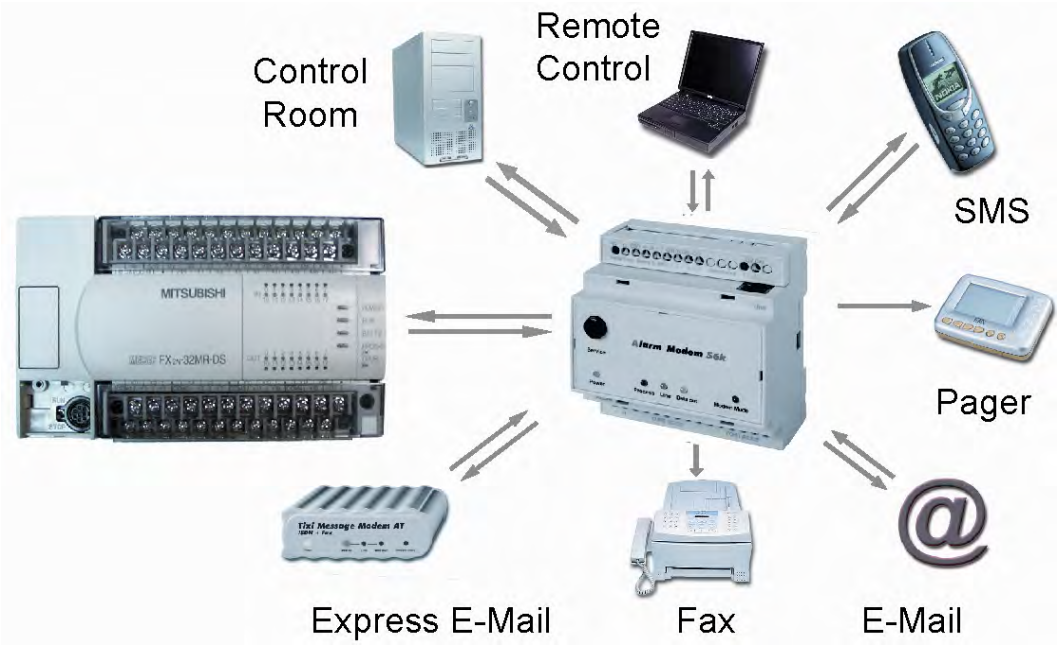
ip SYSTEMES

New Era of Modems

Telemetric Solutions for

Mitsubishi PLCs



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New type of modems for Mitsubishi PLCs

The demand for remote control and low cost fault messaging systems in the automation industry has been steadily rising in recent years. Mitsubishi Electric Europe is now offering a new product line of intelligent and standard industry modems to cope with such demand and to deliver an easy to use and integrated solution with its world class PLC systems.

The new modems connect to Mitsubishi PLCs via RS232, RS422 or RS485 and support the following PLC-Protocols: Alpha XL and MELSEC FX Series (System Q under preparation). These intelligent modems are called Mitsubishi Alarm Modem (MAM) and are configured via the easy to use "MX Alarm Editor" software.

Alarm Messaging via SMS, fax, e-mail
Send alarm messages to service personnel in the event of a malfunction.
Optional: alarming schedule

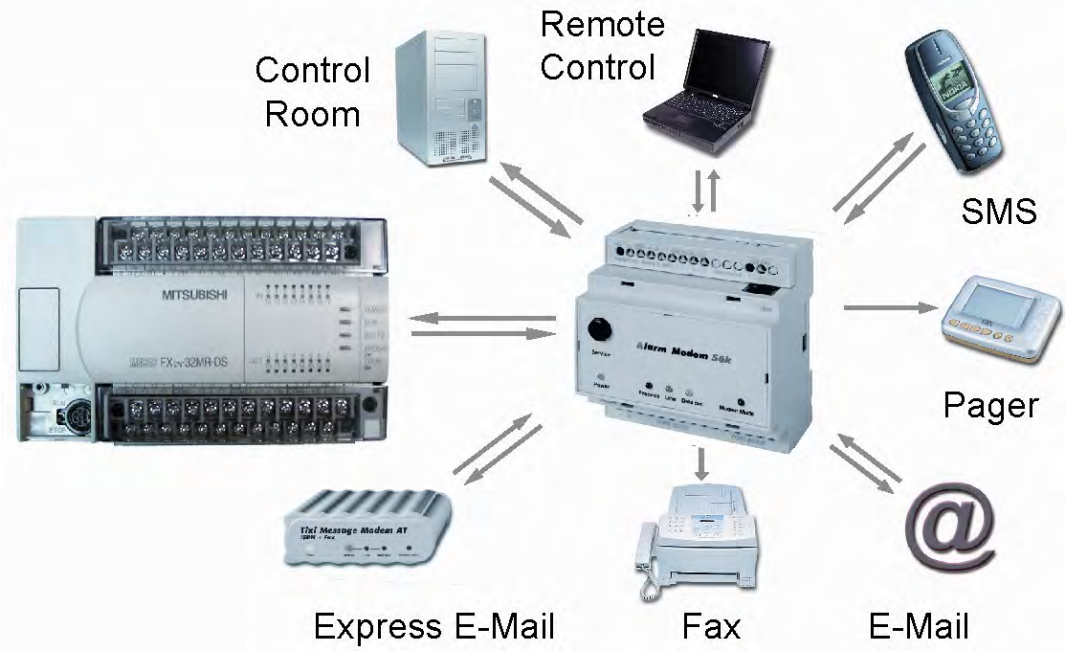
Tele-Switching via SMS and e-mail
Switching of PLC outputs and markers via SMS and dial-in.
Optional: password protection

Remote Maintenance via Modem or GSM
of the PLC and Alarm Modem
Optional: password protection

Options planned for later versions:

Data Logging
Collects data from PLCs and sends it at regular intervals by
fax, e-mail or SMS.

Web Server
Visualization of logged data and PLC variables via the Internet or via dial up connection



Strategic Cooperation between Mitsubishi Electric Europe and Tixi.Com

Having analysed several vendors of industrial modems, Mitsubishi Electric decided to go with the one who could offer the most advanced modem architecture, the most future-oriented product design and the most appropriate product range: The Berlin based modem manufacturer Tixi.Com GmbH.

Tixi.Com Telecommunication Systems has become famous in the industrial market for its unique high level modem functionality, easy configuration and direct communication with many PLC systems. One of the most outstanding features of these intelligent modems however is, that the PLC programs do not need to be changed at all in order to use all these new remote functions.

Mitsubishi Electric is starting to market a basic range of intelligent functions for fault messaging, remote switching and remote control. Higher level functions, like data logging, embedded web server and direct access via the web and other options like ISDN-modems, intelligent routers or memory extensions may be offered later. In case of an earlier need of these options, especially in conjunction with high-volume projects, the local Mitsubishi Electric representative will contact the European Product Managers (M. Ginty, H. Voigt) for more information.

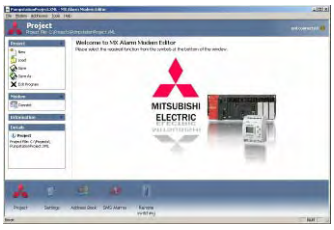
Mitsubishi Electric branded Tixi modems are exclusively sold by Mitsubishi Electric Europe B.V..

Modem Overview

The Mitsubishi Alarm Modem family is based on a powerful 32-Bit RISC CPU architecture with large program and data memory, future-oriented XML database and the Tixi Embedded Communication System. This new modem generation replaces ancient, traditional modems, developed 25 years ago.

1. Alarm Modems
Alarm Modems speak the „languages“ (= protocols) of the Mitsubishi PLCs (Alpha XL, MELSEC FX and System Q).
They have access to all PLC variables and ports and can monitor them without need to change the PLC program. They are equipped with 2MB of flash memory for user data and with a battery-buffered real-time clock.

2. Alarm Editor
Easy to use Windows software for entering an address book of message destinations and a message book with text templates for alarms.
Alarm message conditions may be linked to PLC I/O-ports or variables.
(25 year old AT-commands are not necessary for configuring Alarm Modems.)
Includes a dialler for establishing a remote connection to the PLC connected to an Alarm Modem thus opening easy access for the programming software of the PLC.



3. Super Modem 56K
Analogue high speed 56k Modem for remote access to PLCs.
Sending and receiving of SMS over land line as well as sending and receiving of Express E-Mail is supported.
PLC needs to control the modem functions using AT-commands.
50K memory for user data (RAM, not powerfail safe).
No PLC-protocol.

4. Standard Modem GSM/GPRS
GSM/GPRS modem for remote access to PLCs using standard mobile phone networks (GSM 900/1800).
Sending and receiving of SMS.
No Express E-Mail.
No user memory.
No PLC-protocol.
No automatic functions.

Alarm Modem Features

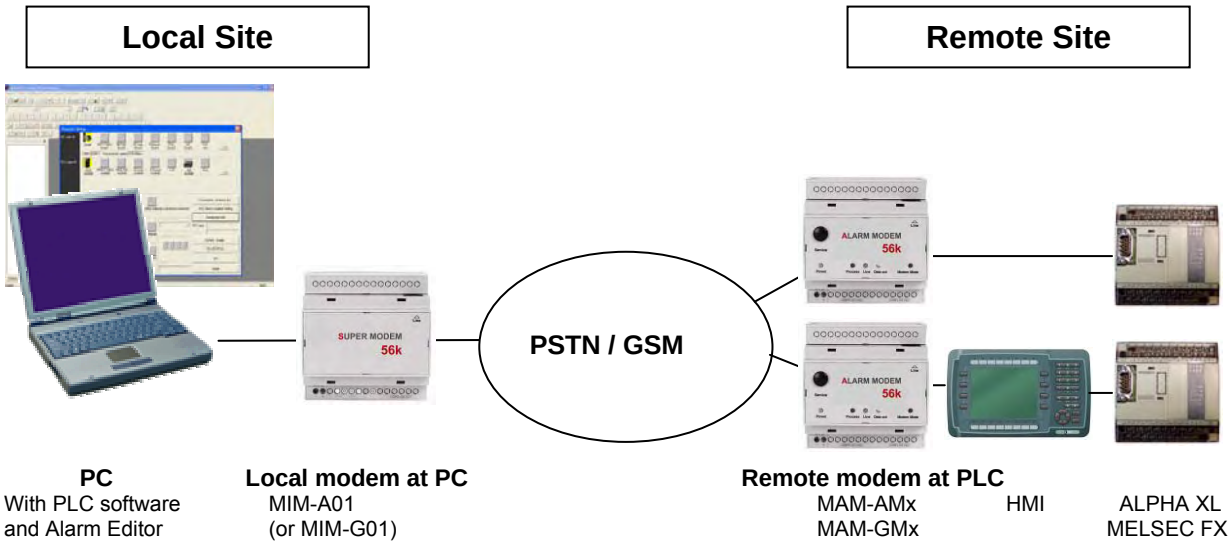
1. Teleservice

The main customer need for modems today is to be able remotely access a PLC for maintenance.

But how does a service engineer know that he needs to check a remote PLC ?
Today he usually waits for the customer to phone him and tell him of irregularities.

The Alarm Modems can monitor PLC variables and send out message with actual PLC values automatically when certain criteria are met.

1.1 Remote access to PLC



PC
With PLC software and Alarm Editor

Local modem at PC
MIM-A01 (or MIM-G01)

Remote modem at PLC
MAM-AMx MAM-GMx

HMI

ALPHA XL MELSEC FX

Local Site
Standard Modem (MIM-A01, MIM-G01) recommended. Most internal modems in laptop PCs should work.
Modems supported by the MX Configurator and other standard industrial modems should work as well but need to be configured.

Remote Site
Alarm Modems (MAM-AMx, MAM-GMx, preferably) no PLC function blocks nor drivers nor changes in the PLC program are needed. No PLC memory used.
Standard Modem (MIM-A01, MIM-G01) for remote maintenance of a connected PLC. Special PLC functions are required to control the communication using standard modems. PLC memory for modem communication, message texts and destination addresses used.

1.2 PLC-Programming Software supported:

- AL-PCS/Win
- GX IEC Developer (56K or GSM connections)
- GX Developer (preferably for 56K connections, timeout problems may occur via GSM)

Variables and I/O ports of a remote PLC can also be read or written to online using the **MX Mitsubishi Alarm Editor**.

1.3 Local and Remote Security

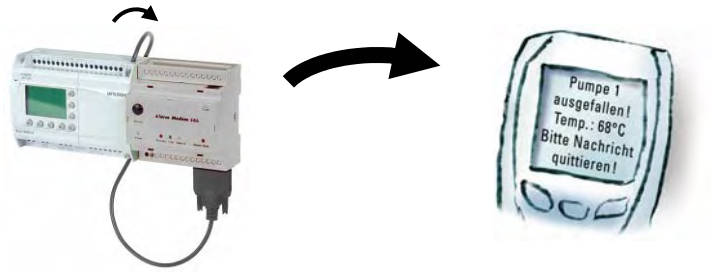
Local and remote access may be protected by means of user names and a passwords.
All dial-ins and dial-in attempts are recorded in a “Login” log file. Unauthorized dial-in attempts may be analyzed from the log file.
These features are only available in Alarm Modems (MAM-AMx, MAM-GMx).

Alarm Messaging via SMS, fax, e-mail

An Alarm Modem can monitor a number of PLC variables and ports.
Upon reaching a user defined criterion it can generate text messages from message templates, fill in actual values from the PLC, and send such messages to a number of recipients.

Message types:

- SMS
- Fax
- e-mail
- Express E-Mail



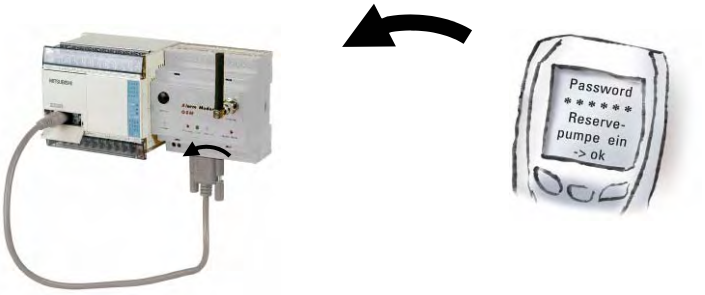
Address book	SMS, fax and e-mail addresses (max. 100) are managed in an address book in Alarm Modem.
Messages	Message texts (max. 100) can contain any number of actual values from the PLC and can be of any required length when used with faxes and e-mails.
Alarms	Up to 100 alarms and actions such as switching commands can be defined.
Alarm cascade	**2 or 3** freely definable alarm levels can be set up if message acknowledgement is desired. In case a message is not acknowledged within a given time, one or more recipients can be notified. This can be cascaded as required.
Site Text	Every message may be appended with a user definable site text that may contain information on the sender location and equipment such as - exact address and position - type and serial number of devices connected - general information such as service company and contract number etc. A short form for SMS may be entered.

Remote Switching via SMS

Remote switching commands may be defined in the Alarm Editor for switching output ports or for writing values to PLC variables, e.g. for changing the set point. Up to 100 such commands with up to 6 parameters may be defined.

Switching via

- SMS
- E-mail
- Express E-Mails
- Simple „Ring“ (caller ID)



Changing of

- PLC output ports
- PLC variables
- PLC display (e.g. Alpha XL or HMI)

Example:

SMS	Reaction
“Password SetTemp 5 23”	Sets temperature in room no. 5 to 23° C

Remote Switching at no cost

Mobile phones usually display the number of the calling party when a call is arriving.
This feature can be utilized by the Mitsubishi Alarm Modem as a switching command thus avoiding the telephone charges of a connected call or an SMS. Caller-ID recognition or CLIP is the usual term for this feature.
Attention: Use of this features implies that the user will have to change his Alarm Modem configuration each time different mobile phones or SIM cards will be used.

Acknowledgment of the Switch Command

The execution of the remote command may be acknowledged by SMS, fax, e-mail or Express E-Mail, so the sender of the command may know shortly if the command was executed successfully or not.

Example:

Case	Acknowledgment SMS
If successful	Temperature in room no. 5 set to 23° C. Site: weekend house in Berlin-Wannsee, Device: MEE A/C 1234567. S/N: 98765432
If not successful	Error: Command SetTemp 5 23 not executed. Site: weekend house in Berlin-Wannsee, Device: MEE A/C 1234567. S/N: 98765432

Current Status Query via SMS

In many service situations a quick check of the current status of a remote system is desirable.

Mobile phones are everywhere nowadays. A PC or laptop equipped with a mobile phone modem (GSM) or with an analogue modem and a land line telephone jack may not be within easy reach.

The current status can easily be queried within less than a minute by sending an SMS to the Alarm Modem. All that needs to be done for such a case is to define one or more “Send Status” commands in the Alarm Editor by entering the important variables in a message template.

Example:

SMS	Reaction
“Password status”	The current values of all variables defined in the command “status” are put into the predefined text message and are sent off via SMS, fax or e-mail.

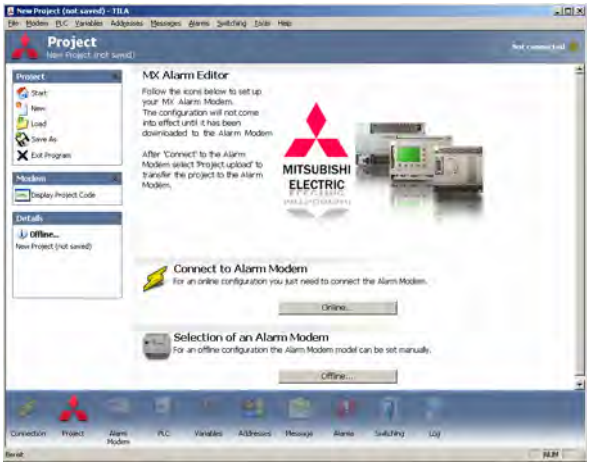
Return SMS:	Outside temp: -21°C temp in room 5 (bathroom): 4° C GSM signal: good. Site: weekend house in Berlin-Wannsee, Device: MEE A/C 1234567. S/N: 98765432

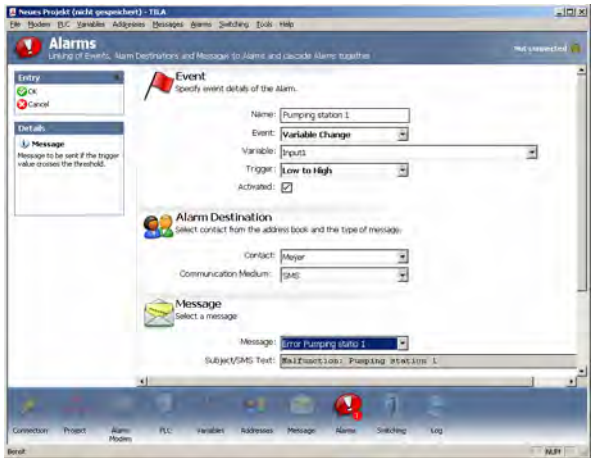
Checking the current status of a remote system can be done without a PC – just by using a mobile phone.

Mitsubishi Alarm Editor

The Mitsubishi Alarm Editor is a simple to use Windows software (XP, 2000) for configuring many functions of the Alarm Modems. You can fill in the address book with the contact details of the recipients of the messages and the message template book, and you can define alarm event conditions and remote switch commands. You can also establish a remote connection to a remote site and then run your PLC programming software and monitor or reconfigure remote PLCs.

USP: No AT commands required. - Never. Nowhere.





Example: Configure an Alarm Message upon input 1

The following chart shows the steps to configure an SMS and fax alarm message on short cutting digital input 1 (I1) of an Alpha XL. The message will contain the status of the input port I1 (0 or 1).

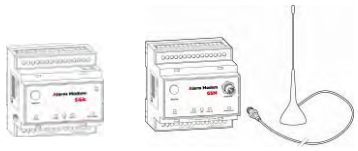
	Menu Icon	Action
1		**Alarm Modem Settings** Enter modem, phone, internet and location settings
2		**PLC** Define the Alpha XL as PLC with Station ID: 1, poll rate: 1s
3		**Variables** Define the input port 1 of the Alpha XL as variable. Use the following descriptions: name: „input1“, format: true: „pump on“, false: „pump off“
4		**Addresses** Define the recipient‘s address data (name, e-mail address, fax number, SMS number, ...)
5		**Messages** Create a message text including a variable for „input1“
6		**Alarms** create an alarm: „digalarm1“
7	**Save**	Save this project to file and into the Alarm Modem
8		**Alpha XL:** Shortcut input1 on Alpha XL to trigger the alarm

Modem Models

Alarm Modems for Alpha XL and MELSEC FX Series — ELP: 56k / GSM

1. Mitsubishi Alarm Modem M6 56k / GSM 1 x RS 232

- remote configuration of a Mitsubishi Alpha XL / MELSEC FX
- **6** Alarms on PLC input ports or variables via SMS, e-mail or fax
- **4** Remote switching events (switching of PLC outputs or variables) via SMS or incoming call
- **2** Alarm levels
- **2** MB user memory (powerfail safe)



1 x RS232 (female)
6 Alarms

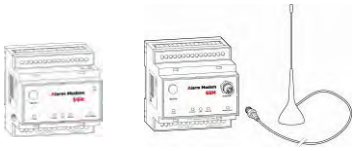
2. Mitsubishi Alarm Modem M20 56k / GSM 2 x RS 232

- remote configuration of a Mitsubishi Alpha XL / MELSEC FX
- **20** Alarms on PLC input ports or variables via SMS, e-mail or fax
- **20** Remote switching events (switching of PLC outputs or variables) via SMS or incoming call
- **3** Alarm levels
- **2** MB user memory (powerfail safe)

2 x RS232 (female / male)
20 Alarms

3. Mitsubishi Alarm Modem M24 56k / GSM 1 x RS 232, 1 x RS 485

- RS 485 supports Mitsubishi „Format1"-protocol for MELSEC FX networking
- Remote configuration of a Mitsubishi MELSEC FX PLC
- **20** Alarms on PLC input ports or variables via SMS, e-mail or fax
- **20** Remote switching events (switching of PLC outputs or variables) via SMS or incoming call
- **3** Alarm levels
- **2** MB user memory (powerfail safe)



1 x RS232 (female), 1 x RS485
20 Alarms

Standard modems 56k and GSM

4. Mitsubishi Super Modem 56K 1 x RS232

- Analogue high speed 56k Modem for remote access to PLCs
- Sending and receiving of **SMS** over land line as well as Sending and receiving of **Express E-Mail**
- PLC needs to control the modem functions using AT-commands
- 50K memory for user data (RAM, not powerfail safe)
- No PLC protocol

1 x RS232 (female)

5. Mitsubishi Standard Modem GSM 1 x RS232

- GSM/GPRS dual band modem for remote access to PLCs using standard mobile phone networks (GSM 900/1800).
- SMS send and receive functions
- PLC needs to use AT commands
- No user memory
- No intelligent functions
- No Express E-Mail
- No PLC protocol

1 x RS232 (female)

Product Overview

Alarm Modem

Code	Model Code	Ports	PLC Protocol	Alarms/ switching	PLC-remote	Flash Memory
Alarm Modem M6	MAM-AM6 MAM-GM6	1 x RS232	yes	6/4	yes	2 MB
Alarm Modem M20	MAM-AM20 MAM-GM20	2 x RS232	yes	20/20	yes	2 MB
Alarm Modem M24	MAM-AM24 MAM-GM24	1 x RS232 1 x RS485	yes	20/20	yes	2 MB

Software “MX Alarm Modem Editor” for Alarm Modem (MAM) configuration

MX Alarm Modem Editor is a simple to use configuration tool for editing alarm messages with PLC variables. MX Alarm Modem Editor can be used for remote configuration of Mitsubishi Alarm Modems with optional password-protection. All entries are stored in a project file (XML) which is loaded into the Alarm Modem locally via RS232 or remotely via a dial-up modem connection.

Code	Model Code		Contacts/ Messages	Alarms/ switching	Description
MX Alarm Editor Pro	MX-MAE-M100		100	100	For systems with many recipients, messages and alarm conditions. Recommended for: Alarm Modems **M20, M24**
MX Alarm Editor	MX-MAE-M6		6	6/4	Recommended software for small systems (Alpha XL): Alarm Modems **M6**
MX Alarm Editor Lite	MX-MAE-M1	Free	1	1	Free demo version for all Alarm Modems **M6, M20, M24**

Mitsubishi PLCs supported by Alarm Modems

- Alpha XL
- MELSEC FX1S, FX1N, FX2N, FX2NC, (FX3U)
- (MELSEC System Q (MC24 protocol) under preparation)

Features for: Alpha XL and **MELSEC FX**

- Alarm messaging (SMS, e-mail, fax)
- Alarm cascade (2-3 levels)
- Remote switching of PLC outputs and variables
- Remote configuration of PLC
- Variables and ports for messaging (6/4, 20/20)
- Password protection for local and remote configuration.
- Further options, like data logging or web server functions: check with EBG.

Standard Industrial Modem

Code	Model Code	Price	Ports	PLC Protocol	Alarms/ Recipients	PLC-remote	Memory
Super Modem 56k	MIM-A01		1 x RS232	-	-	yes	50K RAM
Standard Modem GSM	MIM-G01		1 x RS232	-	-	yes	-

Software “MX Configurator MIM” for MIM setting.

MX Configurator MIM is a simple to use modem configuration software that helps setting up a modem while avoiding AT commands.

Sales Arguments

1. The Difference: "Old" Modems ./. Intelligent Modems

1.1 Modem Technology is 25 years old !

Standard modems have not really changed in the past 25 years. They are still controlled by the very same, simple commands that were used about 25 years ago. Such modems cannot send e-mails or faxes by themselves – they always need a PC with communication software or a special, expensive communications controller device. In the industrial electronics world there are no PCs – hence there is no easy, cost efficient remote communication for PLCs.

1.2 Tixi Intelligent Modem Technology

The telecommunications specialist Tixi.Com in Berlin, Germany, has solved this huge problem in a very convenient way by integrating all Internet and telecommunication functions and software right into the modem itself.

A Tixi Modem is an intelligent communications controller featuring a powerful 32 Bit CPU, large Flash memory and state-of-the-art Internet technology using an XML data base architecture.

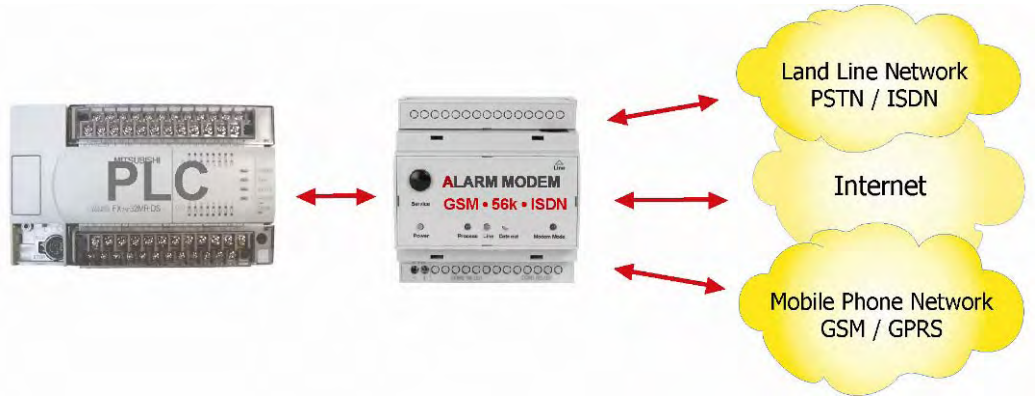
Main features

- send and receive e-mail, fax, SMS, Express E-Mail
- optional Data Logging
- optional Web Server and communication with new web services (see page 22)
- Flash memory 2 MB, expandable to 66 MB
- Open interfaces for hardware and software developers
  Modular hardware and software system.

1.3 Missing Link for PLC-Systems

In addition to the complete set of remote communication functions Mitsubishi Alarm Modems could be able to support more than 25 native PLC and Fieldbus protocols.

Mitsubishi Alarm Modems work as multi-lingual interpreters between PLCs and "the outside" world of remote communication and the Internet.



A PLC does not need to "know" anything about Internet and remote communication.
Using Mitsubishi Alarm Modems there is no need to change any bit in your PLC program as the MAM "understands" your PLC and can read and write PLC variables and I/O-ports like your programming software can.

Intelligent functions can be configured with an easy to use Windows program, the Alarm Editor.
– Old cryptic AT-commands are not needed anymore (but do work with Mitsubishi Alarm Modems.)

2. New Business: Teleservice for PLCs

700 million PCs worldwide use Internet and telecommunication.
But PLCs still have no connection to the "outside" world.

Mitsubishi Alarm Modems open remote communication to the PLC world
with the Tixi modem system that is not unlikely to become a new modem standard for PLCs.

Strong points

- **Powerful system**
  - 32bit CPU
  - Data memory 2 MB user memory (non volatile) up to 66 MB
  - Scalable system (feature packs, extension modules)
  - Various interfaces, field busses and protocols
- **Advanced teleservice functions**
  - Remote switching via SMS or simple "ring"(caller ID)
  - Remote maintenance via modem connection
  - SMS over landlines
- **Strong communication capabilities**
  - Direct PLC communication
  - Main communication protocols already built-in:
    SMS, e-mail , fax (real e-mail + fax, not as SMS, unlimited characters),
    Express E-Mail
  - Internet functionality implemented for 2nd step (webserver, e-mail, …)
  - All networks supported (GSM, GPRS; 56k (ISDN, Ethernet for 2nd step)
- Very user-friendly configuration
- Industrial design

Weak points

- Customer expects a modem price of 50 – 100 Euro

Main Advantages

- Direct communication via PLC protocol, no PLC program change needed for alarming and data logging
- Intelligence
- Fully automatic sending of SMS, e-mail, fax
- Embedded Data Logger (2nd step)
- Embedded Web Server (2nd step)

Most important sales arguments

- Alarm Modem is the only modem on the market that talks directly to PLCs via the protocol
- Low price / high functionality
- Ground-breaking feature mix in one device
  (modem, data logger, alarm messenger…)
- Future oriented technology, Internet already built-in
- Scalable system can grow with customer needs

Competitor Analysis

Main international competitors in the field of standard industry modems are

- **Westermo** industrial quality GSM and analogue modems
- **Siemens** GSM modems only
- **Sony-Ericsson** GSM modems only

These modems have no special intelligence nor functions other than SMS sending and receiving in GSM-modems using AT-commands.

Regional players with market shares mainly in Germany are:

- **Insys** similar to Westermo modems
  10 SMSes can be stored and triggered via I/O ports.
  One modem type supports some communication with Siemens Logo!
  No other PLCs supported.
- **ICON AG** High level remote control system with a few 6 I/Os for building automation.
  Supports EIB, a web cam, data logging etc.
  No PLC protocols.
  Is OEMed by some companies, i.e. ABB, Merten.
- **LUCOM** modem with data logger

A detailed comparison is attached as appendix:

- GSM modem comparison Appendix B
- Analogue modem comparison Appendix C

Summary of the comparison
No other modem offers such an advanced set of automatic communication functions.
No other modem offers PLC and field bus protocols like the new Alarm Modems.
The ICON AG ic.1 Controller comes closest to Alarm Modems.

Customer says: "**Modem Xyz has the same features as the Alarm Modem.**"
Do ask the customer for details of features like: e-mail, fax, alarming, remote switching, memory type and size, logging and – above all – pricing, model number and manufacturer. Mostly, the customer will not know these data "exactly" and will "give up" if you insist there is no other modem on the market (except Tixi.Com Alarm Modems).

Some standard modem makers, e.g. Insys, advertise their modems can send e-mails. This is not true. Their modems can send an SMS to an SMS service center which can convert an SMS-text into a very short e-mail of 160 characters less the e-mail address. Only ICON AG and Lucom controllers support real e-mailing like Alarm Modems.

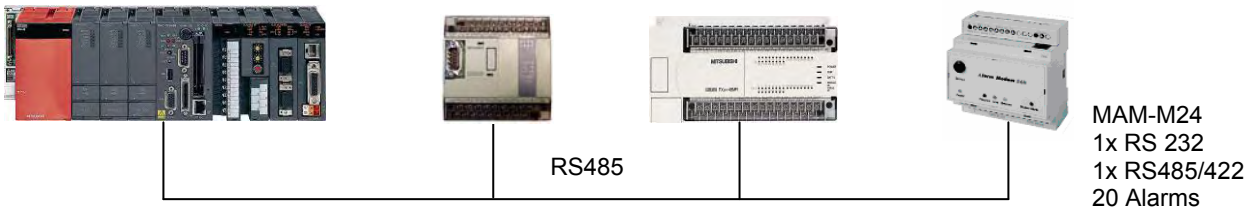
With the new Alarm Modem family Mitsubishi Electric will take the leadership in the PLC market for remote communication.

Special Features

Networking PLCs

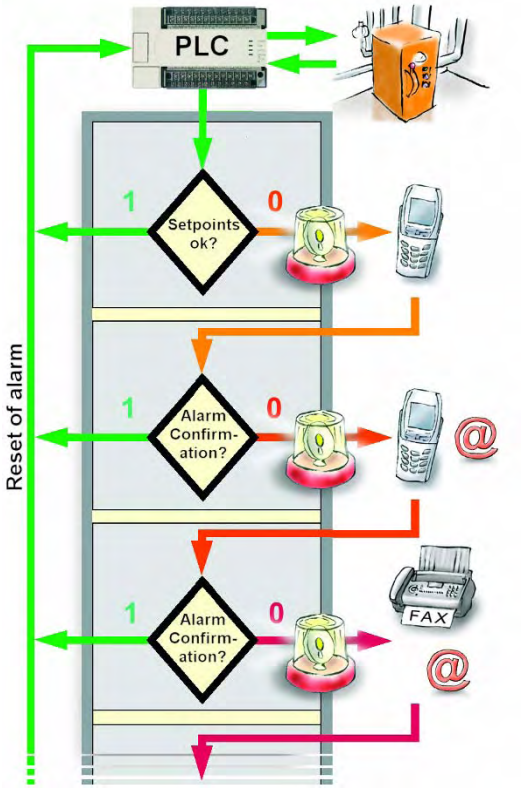
Alarm Modems with an RS485 interface are able to access networked PLC. They can address each individual station and access data (variables, ports etc.) of each individual PLC via the Mitsubishi Multi-Drop protocol (or Format1 protocol):

Example:



Alarming Schedule - the Multi-Level Alarm Plan

Up to 3 freely definable alarm levels may be configured.



Example:

The Mitsubishi Alarm Modem monitors the variables and ports in a PLC.

Alarm Level 1:
In the event of a fault being detected, MAM sends an SMS to service technician A.
If this person acknowledges receipt within a predefined time (e.g. 10 minutes), MAM resets the alarm.

Alarm Level 2
If MAM does not receive the acknowledgment within the pre-defined time, it starts alarm level 2 and sends several messages to other destinations:

- An SMS to service technician B,
- a fax to the service center,
- an e-mail to the owner of the equipment and one to the archive data base on the web.

Alarm Level 3
If technician B does not acknowledge receipt within a defined time, MAM initiates the next alarm level.

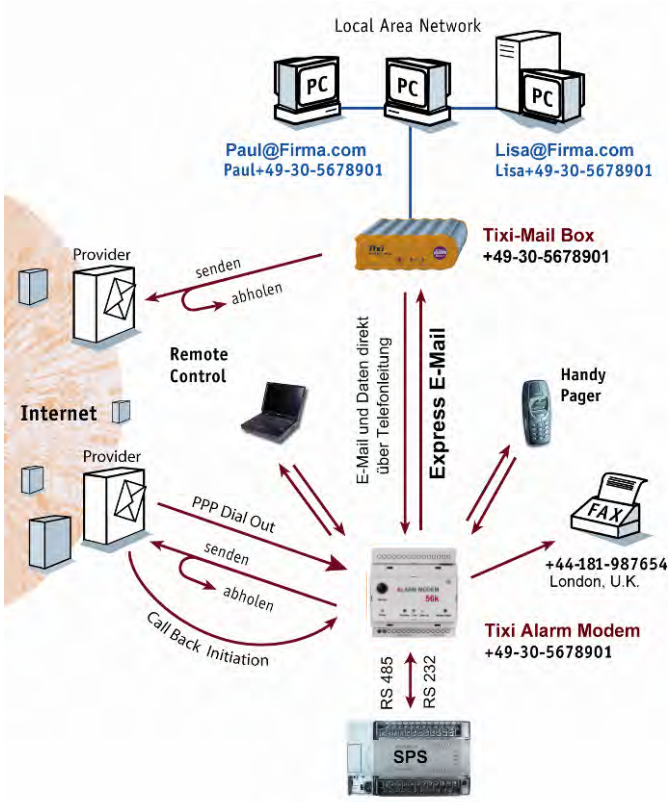
Express E-Mail = E-mail via Phone Lines

Send an e-mail to a PLC ? **No delivery available.**

Impossible. Internet e-mail is not delivered but must be retrieved from an Internet mail server. The e-mail may never arrive since the Alarm Modem connected to the PLC does “know” if and when to pickup e-mail. Thus the runtime of e-mails is completely uncertain – unless the recipient is permanently connected to the Internet or connects at regular intervals.

Send an Express E-Mail to the PLC ! **Direct, immediate delivery.**
Express E-Mail is direct e-mail via phone lines without the Internet.

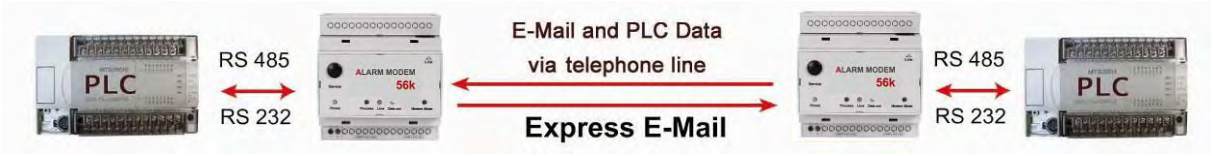
Although very similar to Internet e-mail, its destination address consists of a user name and an international telephone number with country code, area code and local phone number. Communicating via the telephone network has several advantages: fast, i.e. immediate transmission, confidential and secure transmission, immediate confirmation of delivery (like faxing.)



Direct data link between PLCs using Express E-Mail

Express E-Mail can be used to transfer data from one PLC to another PLC and vice versa:

- regularly (e.g. once every hour) or
- upon an event (e.g. triggered by PLC marker or input)



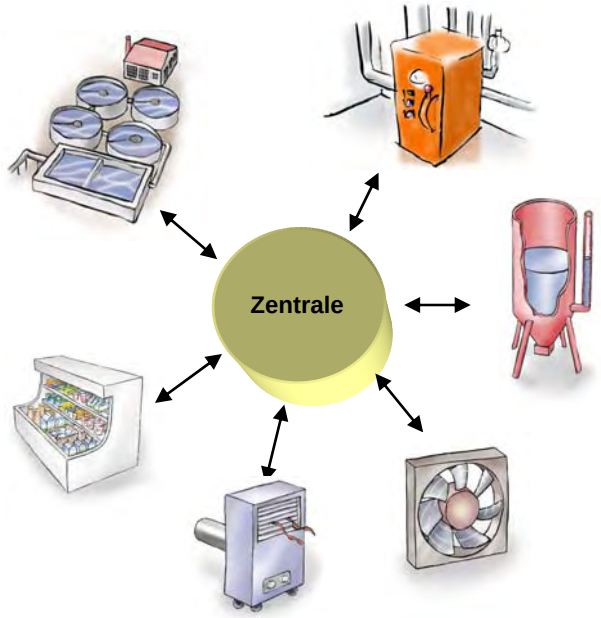
Any type of variables can be “mapped” (automatically updated) between:

- PLCs of the same type
- PLCs of different types, same manufacturer
- PLCs of different manufacturers (if protocol is supported by Alarm Modem).

Main Application: Small and low cost remote sites

Modems for remote maintenance and teleservices are a good choice especially for all those small and de-centralised devices and stations, which are mostly situated at locations without any tele-communications and network infrastructure, e.g.:

- **Heating systems**
- **Air conditioning systems**
- **Pumping stations**
- **Tanks**
- **Weather stations**
- **Cooling systems**
- **Containers**
- **Drives/Frequency converters**
- **Vehicles**
- **Meters for**
  Gas, water, electricity, heat
- **Industrial controllers**
- **PLCs**
- **Measuring devices**
  (data loggers, sensors)



On-site services are cost-intensive

All these devices have to be installed, configured and maintained. These services are cost intensive. Remote maintenance can help to reduce these costs dramatically, e.g. by saving travel time and expenses.

Alarm Modem Technology

No More AT Commands – XML Modems for the Future

Today's "standard" modems are still controlled by the very same primitive AT commands that were used 25 years ago! This has been a tremendous obstacle in to telecommunication and Internet communication in industrial electronics.

The Alarm Modem Modem System is based on a powerful 32-bit RISC CPU and the TECom high-level remote communication system, which is configured using state-of-the-art XML technology.

Example of address book entries:

```
<AddressBook>
  <Meyer>
      <EMail    _="Meyer@Firm.de"/>
      <SMS_No   _="+49-174-1234567"/>
      <SMS_Provider    _="D2"/>
      <Fax      _="+49-89-1234567"/>
      <Express  _="Meyer+49-89-1234580"/>
  </Meyer>
  <Schneider>
      <SMS_No   _="+49-171-9876541"/>
      <SMS_Provider    _="D1"/>
  </Schneider>
</AddressBook>
```

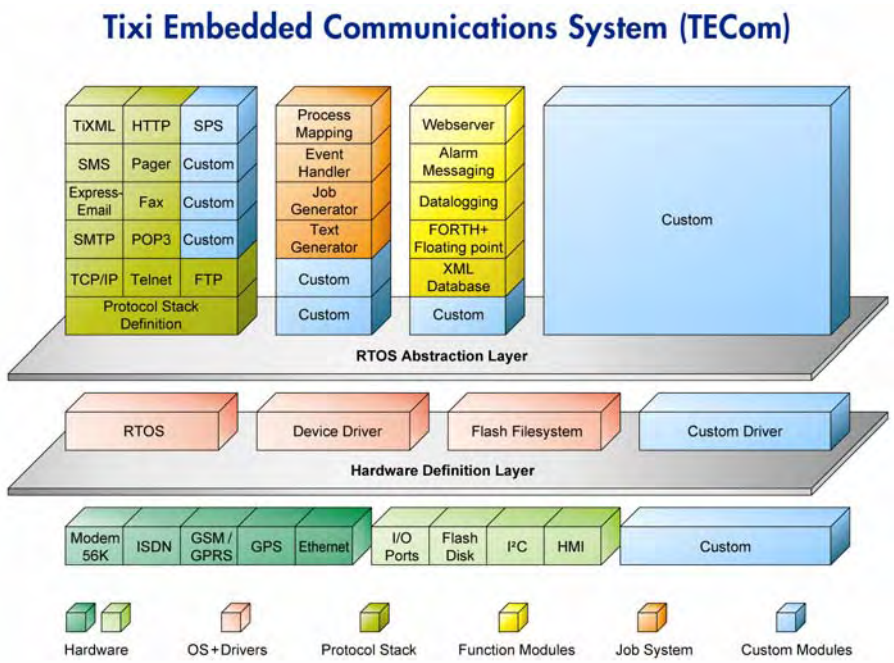
Message template with variable installation and site information:

```
<UserTemplates>
  <AlarmMsg30>
        <L _="Room temperature too high."/>
        <L _="Act. Temp.: {Temperature} °C"/>
        <Include ="/D/UserTemplates/SiteInfo"/>
  </AlarmMsg30>
  <SiteInfo>
        <L _="Installation: Super AC type 13"/>
        <L _="Building: Reichstag,R.2001"/>
        <L _="Site: Berlin, Germany"/>
  </SiteInfo>
</UserTemplates>
```

The message definition contains references for the recipient in the address book, and to a template in the text database (User Templates) for the message text. This template in turn contains a reference to particular site information. This example shows the highly flexible and future-oriented approach that XML offers for configuring the Alarm Modems. It can also be used for the later configuration of alarm devices via the Internet (just imagine what this task would be like using AT commands!).

Definition of the message:

```
<MessageJobTemplates>
  <EmailAlarm30 _="SMTP">
        <Recipient _="/D/AddressBook/Meyer"/>
        <Subject _="Room temperature over 30 °C !"/>
        <Body     _="/UserTemplates/AlertMsg30"/>
        <ToDo     _="Check installation within 30
                     min.!"/>
  </EmailAlarm30>
  <SMSAlarm30 _="SMS">
        <Recipient _="/D/AddressBook/Meyer"/>
        <Subject _="Room temperature over 30 °C!
                     Reichstag, R. 2001, Berlin"/>
  </SMSAlarm30>
</MessageJobTemplates>
```

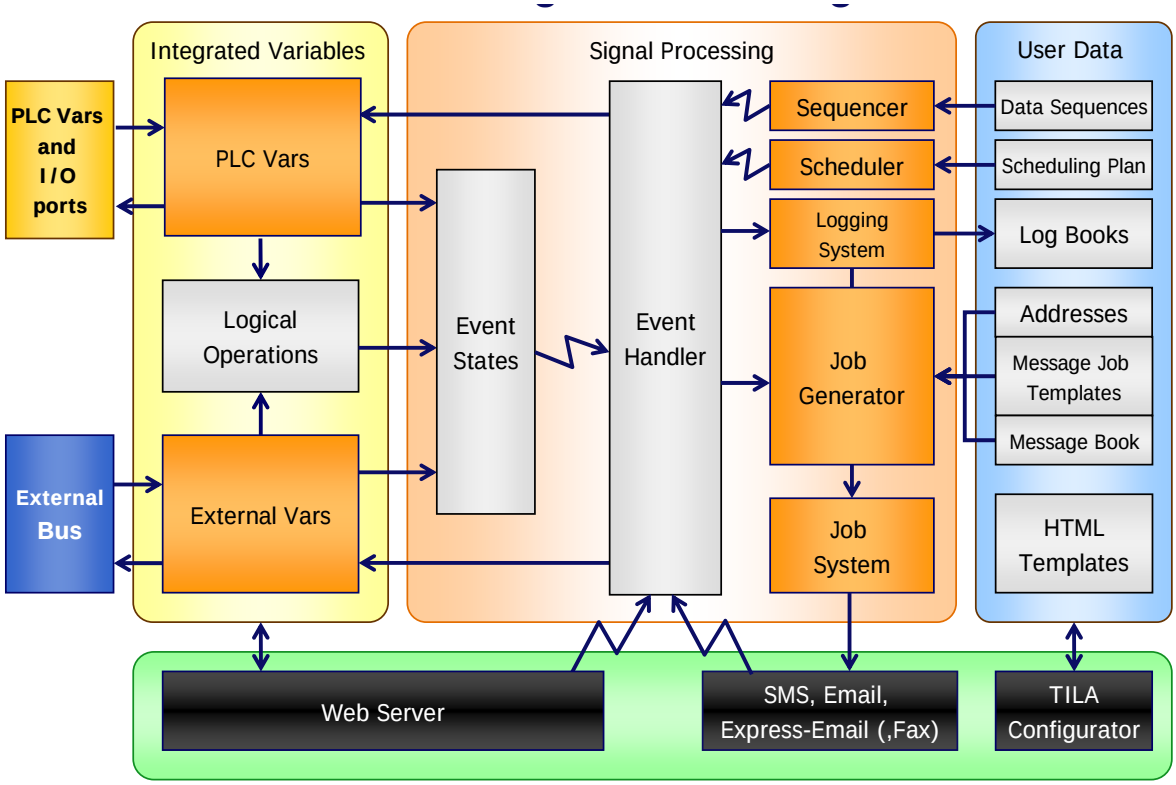


25 year old modems:

AT command interpreter

TiXML Achitecture and Alarm Modem Job System

Core of the Alarm Modem system architecture is an Event Handling system processing all external and internal event states. Events can be triggered by integrated variables (I/Os) and external variables referring to PLC markers or variables. The scheme below shows the main function blocks of the system architecture.



Internet Capabilities of the Alarm Modems

1. Embedded Web Server (option)

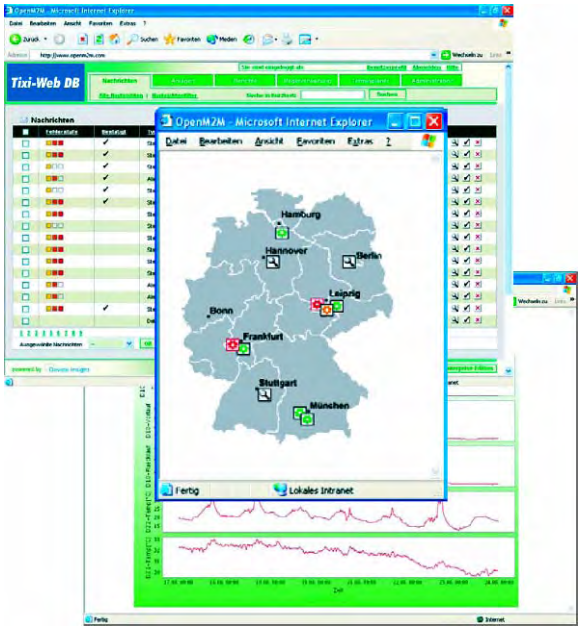
The embedded web server can be connected with any standard web browser and can be used to

- visualize the status of PLC variables or I/O ports
- call-off log data (system or customised log)
- remotely switch variables or ports by mouse click (or to assign values to variables)

To access the Alarm Modem's web server a dial-up connection to the Alarm Modem has to be established.

2. Smart Internet Service to access websites held in an Alarm Modem

The Internet is designed for dial-up connections primarily. But how to get out of the Internet to access devices? Tixi operates a web service to get internet access to devices in the field using dial-out facilities: www.devicecontrolweb.com.



For details please refer to appendix D.

3. Dedicated web database for log data collected from de-centralised devices

This portal

- can handle log data stored in an SQL database
- creates reports on selected variables for given period
- hold machine data (location, set-up date, last inspection…) for various types of devices and locations
- has a built-in rule-based messaging function

Any number of devices and of users can be administered. Only an Internet connection is required to access it.

For details please contact EBG, Mr. Voigt or Mr. Ginty.

Appendix A: Mitsubishi Modem Overview

Product	Mitsubishi Super Modem 56k	Mitsubishi Standard Modem GSM	Mitsubishi Alarm Modem M6		Mitsubishi Alarm Modem M20		Mitsubishi Alarm Modem M24	
Type	56k	GSM	56k	GSM	56k	GSM	56k	GSM
Product Code	MIM-A01	MIM-G01	MAM-AM6	MAM-GM6	MAM-AM20	MAM-GM20	MAM-AM24	MAM-GM24
Art. No.	163285	163286	163283	163275	163284	163276	163274	163277
User Memory min	50 kB SRAM (not powerfail save)	-	2 MB Flash Memory (non-volatile)					
max	-	-	Max: 64 MB Flash Memory (non-volatile)					
Message Types (send + receive)	SMS - - Express E-Mail	SMS - - -	SMS e-mail fax Express E-Mail					
Triggered by	External AT commands		Fully automatically (implemented PLC protocols)					

Modem-Features

Remote Maintenance	Yes		yes		
PLC Protocols	-	-	Alpha XL, MELSEC FX, Q series		
Alarms	-	-*	6	20	20
Contacts	-	-	6	20	20
Messages	-	-	6	20	20
Switching commands	-	-*	4	20	20
Alarm levels	-	-	2	3	3
Confirmation	-	-	yes		
Data Logging	-	-	-	option	option
Web Server	-	-	-	option	option

Software (recommended)	MX Configurator		MX Mitsubishi Alarm Editor	MX Mitsubishi Alarm Editor Pro	MX Mitsubishi Alarm Editor Pro
			MX Mitsubishi Alarm Editor Lite For demonstrating purposes		

Technical Data

Interfaces	1 x RS232 (female)		1 x RS232 (female)	1 x RS232 (female) 1 x RS232 (male)	1 x RS232 (female) 1 x RS485 (screw terminal)
System Clock	-	-	Real time clock, battery backed		

* via function blocks in AL-PCS/Win Alpha XL configuration software
max. number of characters: 48 (size of display)
Switching via SMS available may/june 2005

Accessories

Product code	Art. No.	Describtion	
MAM-ANT-5A	163278	GSM magnetic mounting antenna with FME connector, 5dB, cable lenght 3m	
MAM-232CAB	163279	RS232 cable, DSUB-9, male-female 1:1; cable lenght 1,8m	
MAM-232ADP/BLUE	163280	RS232 Gender-Changer, DSUB-9, male-male; to connect PLC programming cable to COM1 of the MAM	
MAM-232ADP/RED	163281	RS232 Gender-Changer, DSUB-9, female-female; to connect Alpha XL via AL2-GSM-CAB or FX PLC via FXxN-232BD to COM2 of the MAM	
MAM-ANT-ANGLE	163282	GSM angle antenna with FME connector	

Appendix B: GSM Modems

Competitional Comparsion

	Intelligent Modems				Standard Modems		
manufacturer	**Mitsubishi**	**Insys**	**LUCOM**	**ICON AG**	**Mitsubishi**	**Westermo**	**Siemens**
product	Alarm Modem (MAM-GMx)	GSM 4.1	XCome G200	ic.1 (dr6640g)	Standard Modem GSM (MIM-G01)	GD-01 GSM	TC35
Price /							
memory	2 MByte	50 kB	512 kB	256 kB	50 kB	-	-
upgradable	up to 66 MByte	-	-	-	-	-	-
media types							
SMS send	+	+	+	+	+	+	+
receive	+	+	+	+	+	+	+
Fax	+	-	+	+	-	-	-
E-mail	+	-	+	+	-	-	-
Express E-Mail	+	-	-	-	-	-	-
number and length of messages	100, unlimited length	20, 40 +120 *1)	42, 160 *2)		160 characters Alpha XL limited to 48 characters (size of display)		
recipients	100	20	42		+	-	-
Variables	100	-	-	+ (32)	-	-	-
Alarms	100	20	+	+	+	-	-
technical specifications							
DIN Rail mounting	+	+	+		+	+	-
IP/NEMA classification	IP20	-	-	IP20	IP20	-	-
Interfaces							
RS232	1 - 2	1	1	-	1	1	1
RS422/485	1	-	1	-	-	-	-
main features:							
configuration via	MX Alarm Editor and XML	AT-commands	Software	Webinterface	MX Configurator (AT-commands)	AT-Commands	AT-commands
Optimised for Mitsubishi configuration Software *3)	+	-	-	-	+	-	-
remote PLC maintenance	+	+	+	-	+	+	+
remote configuration	+	+	+	+			
PLC protocols	+ *5)	Logo!	-	-			
Fieldbus	+ *5)	-	-	-			
automatic alarming	+ (via PLC)	+ (via I/Os only)	+ (via I/Os only)	+ (via I/Os only)			
telecontrol, modifying variables by SMS	+	+	-	-			
alarm cascades	+	-	+	+			
acknowledgement	+	-	-	-			
data logging	option	-	Max 512 kB	option			
embedded web server	option	-	-	option			
other features							
including variables into messages (flags, registers, I/O ports)	+	-	+ only I/Os	-			
acknowledgement of SMS reception	+	+	+				
caller-identification *4)	+	-	-				
remote config. of alarms and message texts	+	-	+	+			

*1) only 40 variable characters + 120 fixed characters for all 20 SMS messages
*2) 160 characters for sms, 255 characters for Fax
*3) optimised for Mitsubishi Software: MX Configurator, GX IEC Developer
*4) doing switching operations through Caller-ID (authentication)

***5) PLC-protocols of Mitsubishi Alarm Modem Fieldbus protocols**

PLC-protocol Mitsubishi Alpha XL	Fieldbus-protocol Modbus (RTU)
PLC-protocol Mitsubishi MELSEC FX1S/FX1N/FX2N/FX2NC	Fieldbus-protocol Modbus (ASCII)
PLC-protocol Mitsubishi System Q (under preparation)	

Appendix C: Analog Modems

Competitional Comparsion

	Intelligent Modems		Standard Modems		
manufacturer	**Mitsubishi**	**Insys**	**Mitsubishi**	**Westermo**	**Devolo / Elsa**
product	Mitsubishi Alarm Modem (MAM-AMx)	Modem 56k 4.0	Mitsubishi Super Modem 56k (MIM-A01)	TD33 V.90/K56flex™	MicroLink 56k i
memory	2 MByte	50 kB	50 kB	-	-
upgradable	up to 66 MByte				
media types					
SMS					
send SMS via SMS service center	+	+	+	-	-
SMS via land line	+	-	+	-	-
Fax	+	-	+	-	-
E-mail	+	-	+	-	-
Express E-Mail	+	-	+	-	-
number and length of messages	100, unlimited length	10, 40+120 *1)	+	-	-
Recipients	100	10	+	-	-
Variables	100	-	-	-	-
Alarms	100	10	+	-	-
DIN Rail mounting	+	+	+	+	-
interfaces					
RS232	1 - 2	1	1	1	1
RS422/485	1	-	-	-	-
main features:					
configuration via	MX Mitsubishi Alarm Editor and XML,	AT-Commands	MX Configurator (AT-commands)	AT-Commands	AT-Commands
Optimised for Mitsubishi configuration Software *2)	+	-	+	-	-
remote PLC maintenance	+	+	+	+	+
remote configuration	+	+			
PLC protocols	+ *4)	-			
Fieldbus	+ *4)	-			
automatic alarming	+ (via PLC)	4 inputs			
Telecontrol, modifying variables by SMS, e-mail	100 PLC vars	-			
alarm cascades	+	-			
acknowledgement	+	-			
data logging	option	-			
embedded web server	option	-			
other features					
including variables into messages (flags, registers, I/O ports)	+	-			
acknowledgement of SMS reception	+	-			
caller-identification *3)	+	+			
remote configuration of alarms and message texts	+	+			

*1) only 40 variable characters + 120 fixed characters for all 20 SMS messages
*2) optimised for Mitsubishi Software: MX Configurator, GX (IEC) Developer
*3) doing switching operations through Caller-ID (authentication)

***4) PLC-protocols of Mitsubishi Alarm Modem Fieldbus protocols**

PLC-protocol Mitsubishi Alpha XL	Fieldbus-protocol Modbus (RTU)
PLC-protocol Mitsubishi MELSEC FX1S/FX1N/FX2N/FX2NC	Fieldbus-protocol Modbus (ASCII)
PLC-protocol Mitsubishi MELSEC Q	

Appendix D

Future Options of Alarm Modems

- **Data Logging** for single or multiple stations over field bus network with up to 100 data points
- Embedded **web server**
- **Direct Access over the Web** from any PC with any Internet connection

Future modem models

- Alarm Modem GPRS
- Alarm Modem ISDN
- Alarm Modem Ethernet
- Analog and GSM Router Modems

Other PLCs and Fieldbuses

One of the Unique Selling Points (USPs) of Mitsubishi Alarm Modems is that they talk to PLCs in the respective PLC-language. This way Alarm Modems understand various Mitsubishi controllers, but many other ones as well (upon request):

- Siemens Simatic S7-200
- Moeller Easy 400 - 800, MFD-Titan, PS4
- ABB AC010, AC31
- VIPA 100, 200, 300V
- Saia Burgess PCD1, PCD2
- Allen Bradley PICO

Fieldbus

- Modbus RTU and ASCII
- M-Bus
- CAN Bus (2005 Q4)

Attention: Non-Mitsubishi PLC protocols will not be supported by Mitsubishi.

Translator PLC1 to PLC2

Alarm Modems support two different PLC-protocols simultaneously and may thus work as a translator between two totally different PLC systems for exchanging data locally via two serial ports or remotely via SMS, Internet e-mail or Express E-Mail. This features needs special configuration in TiXML and therefore should only be offered in important business cases.